

Some field notes & observations for discussion on the Glacial Geomorphology of Holcombe Brook Valley, Lancashire.

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Holcombe Valley during the Devensian

Apart from the geology being wrong in the exposed rock faces, this is surprisingly near to how the Holcombe Valley would have looked. The view would be looking NNE towards Holcombe Valley Head, there is even the creation of a lateral moraine in progress on the left centre of the image. Photo acknowledgement Arstechnika.

Introduction:

The Holcombe Brook Valley lies to the west of Harcles Hill (known locally as Holcombe Hill) near Ramsbottom in Greater Manchester. The valley has been occupied for many years by the Ministry of Defence as a weapons training area and large sections have not been accessible by the general public until recently. This recent release of land for public access offered the opportunity to local people to explore the area for the first time for many years. There are remains of farms and other buildings, as well as geological and geomorphological features.

The purpose of this report is to put on record a series of observations primarily of the glacial features to be seen in the valley. The observations were made during a recent visit with the Holcombe Moor Heritage Group archaeologists and backed up with internet and desktop research. These observations will it is hoped spark interest and further research and certainly not definitive. Observations were made with some difficulty because of remaining MoD access restrictions and the possibility of unexploded ordnance.

The Holcombe Brook Valley.

The valley is set in area occupied by Carboniferous rocks mainly sandstones, gritstones and shales formed around 316-318 million years ago. (Source BGS) 'formed in detrital channels'. They include the Rough Rock sequence, and a small coal seams namely the Sandrock Mine. And the Six Inch Mine at Red Brook. (Mine means coalseam)

Glacial Trough

The valley is a kind of 'glacial trough' rather than a classic u-shaped valley. The local glaciation has to be considered as part of a larger ice-sheet and its associated feeder mechanisms along the Rossendale Valley around Ramsbottom and the surrounding hills. (See cover photo)

It is highly likely to have been formed during the Devensian glacial maxima period which started around 118,000 years ago. There was also short a re-advance of the ice - the Loch Lomond re-advance - that created small valley glaciers in the Lake District, Pennines, Scotland and Wales. Two small terminal moraines for example, can be found on Pendle Hill. There are sparse granite erratics in the till suggesting a Lake District origin for at least some of the till deposits.

Various researchers from the 19th century to date have suggested that the Rossendale Valley was largely filled with ice moving south especially during the Loch Lomond re-advance. The trimming, shaping and benching of Harcles Hill (Holcombe Hill) suggests there was sufficient ice to engineer both sides of the hill and to effectively envelope it along with adjacent moorland to the north providing a supply of ice down Holcombe Brook Valley. The amount of ice available is not known but my guess, and it is only a guess, is that it would be about 100 metres thick on the moor.

Glacial melting and retreat

The background. Various researchers over the years suggested that the Rossendale Valley somewhere around Ramsbottom was blocked completely by ice or ice-debris forming 'Lake Ramsbottom'. There is however a great deal of conjecture about the possible height of this lake during the melt, some workers suggesting a relatively small lake, others suggesting a lake from Ramsbottom to Rawtenstall. There are englacial meltwater channels on the Cheeseden side of the Rossendale Valley that probably carried water from melting ice in the east towards Lake Bury and towards Heywood. (There is much conjecture on this). The possibility of an even larger lake with a huge moraine has been suggested for the area between Bury and Radcliffe. The sands and gravels of the moraine can be seen in the railway cutting from Radcliffe to Whitefield. There is also a superb post-glacial valley that presumably led water from Lake Bury towards the Croal and Irwell Valleys at Farnworth. Yes, it was on a big scale!

Holcombe Valley during glacial melt

The Valley was probably full to the brim and the associated upland areas would also have held considerable amounts of ice. It is suspected that the Holcombe Valley Head (SD 767 178) may well have been glaciated producing a kind of proto-cirque by ice but this is by no means certain. Other possibilities include glacial over-deepening and Moulin drainage.



Photo acknowledgement NASA

Moulin drainage.

Recent research by NASA and other glaciologists in Greenland suggest that the affect of water drainage through englacial Moulin systems has been seriously under-rated and that they play/played a far more important role that was realised.

Summer melts on the Greenland ice-sheet allow the creation of moulins or temporary seasonal lakes on the ice. Some lakes in Greenland can be huge (e.g. as large as Elton Reservoir as a local example of size) can accumulate readily on the top of the ice discharging with a suddenness downward into the glacier forming englacial passages and meltwater channels. Of course, any other available Ice or melt-water from above the valley head would also have contributed significantly to such dynamic events in-

cluding perhaps, the creation of the wide bowl-shape valley head. The amount of water and therefore its effective dynamic power, is enormous.

Creation of a lateral moraine (SD767 172) approx

The piles of material to be found on the west side of Valley Head have been variously interpreted as hushings (a method of removing overburden to reach or separate out minerals or stone), moraines, and drumlins. I have considered hushings as a possibility but what were they hushing for? Iron nodules perhaps? I cannot see any evidence from the aerial photos of hushing channels, and the hillocks seem to be essentially sand and gravel with till. Access is almost impossible because of MoD restrictions, but I think the likelihood is that it is the remnants of an ice-controlled lateral moraine.

Various writers suggest that a considerable amount of static ice was present on the west side of the Holcombe Brook Valley out towards Edgworth and that drainage was therefore directed towards Holcombe Brook village and Lake Bury. (This includes incidentally the Hawkshaw meltwater channel which would also have drained eastward.)

There is also evidence in several of the stream sections of clay suggesting there was also a temporary tarn or lake at some point in the Valley's history. (SD 767 168 approx.)

The Valley's Meltwater System

The meltwater channel was almost certainly created englacially. Clambering up the hillside from the lower section it is clear that some sculptural glaciation has taken place on the valley side of Harcles Hill and that suggests a similar height (at least) for the impounding ice to the west.

The Ridge is an interesting structure. (SD 769 165 to SD 771 158) Initially it looks as though it might be another englacial feature such as an esker. Eskers are formed of glacial sand, gravel and other material trapped in an ice-tunnel beneath the ice. When the ice has melted the 'cast' of the tunnel is left full of debris. The danger in interpreting this feature as a kind of 'fossil' tunnel is its juxtaposition to the meltwater channel. Two immediate suggestions present themselves.

- a) The meltwater channel has cut deep into the glacial till, sand and gravel, to form the channel. Maybe The Ridge is not really a ridge at all but the remnants of the western side of the valley floor from a period when ice impeded from the west. It has by implication been eroded somewhat on the west after the melting of the ice barrier.
- b) The second far more likely possibility is that it is an earlier or even contemporary englacial feature - an esker. Where the meltwater channel and esker form part-way up the valley there appears to be a close association between the two. There are few exposures on the The Ridge but it appears to be wholly sand and gravel further supporting the esker possibility. Certainly not impossible and quite likely to be contemporaneous or nearly so.

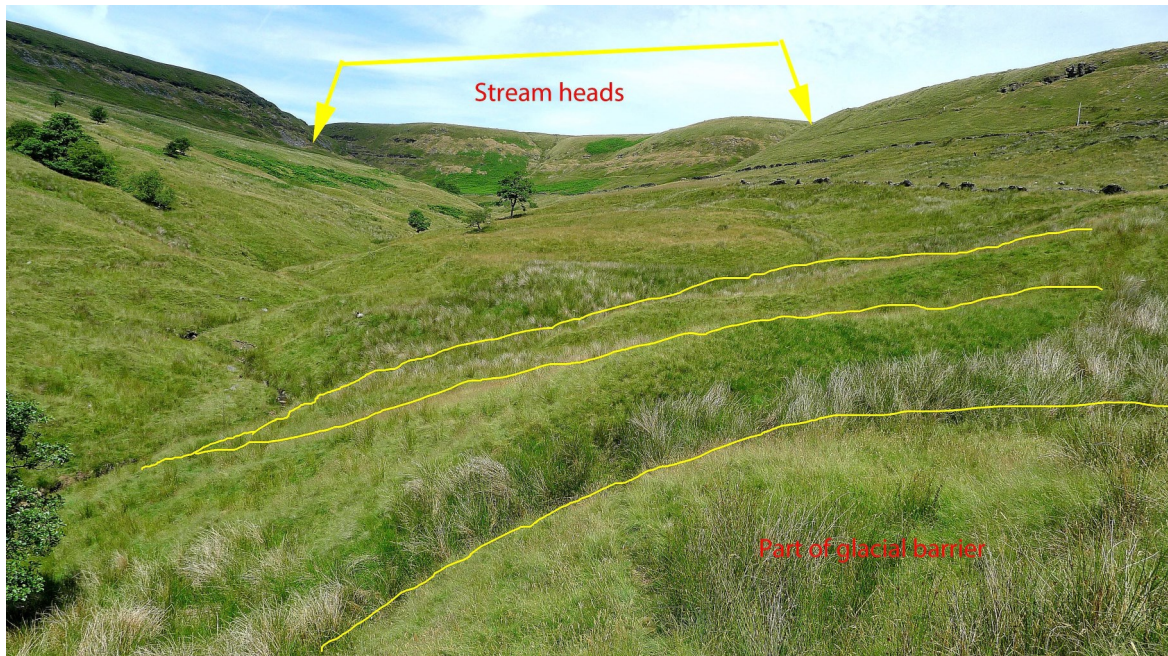


The depression (SD 769 162) shown to me on The Ridge could be a simple kettle hole on the esker. A kettle hole is a small depression (sometimes large enough to be called a tarn) created by the melt-out of an area of buried ice. However there is clearly not enough evidence to assume this - it is a suggestion for further research. It could equally be archaeological, a quarry for sand and gravel, or even a military bomb hole.

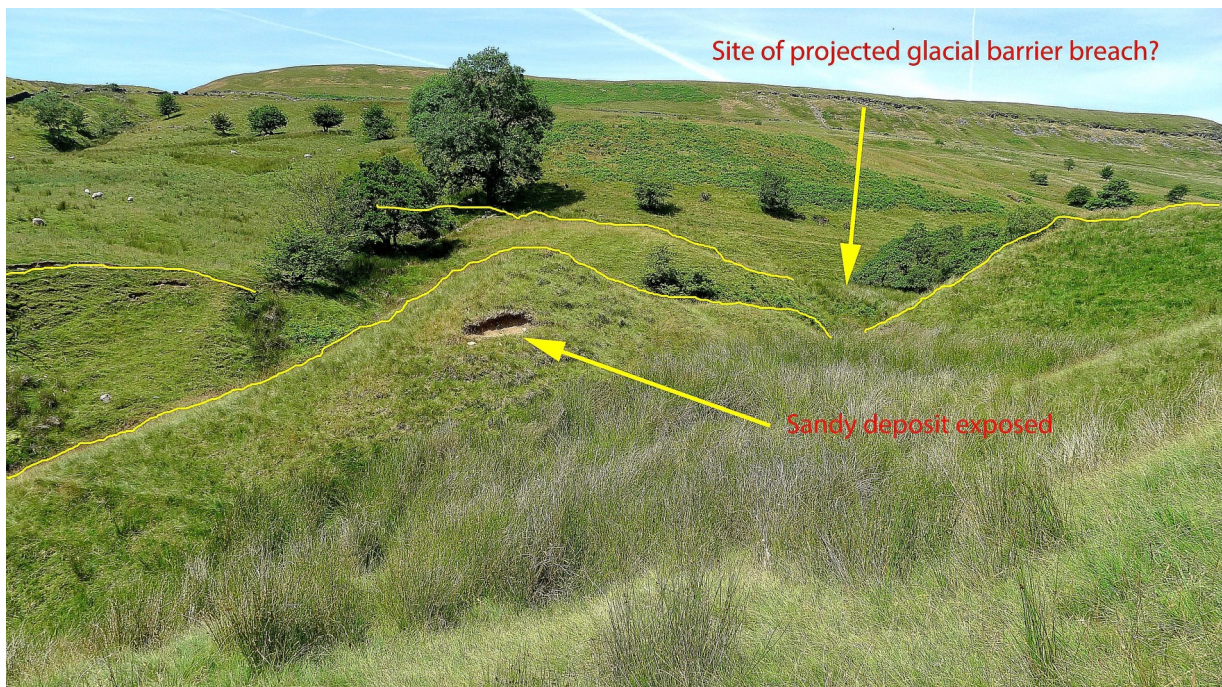
Summary. The valley contains many interesting glacial and geomorphologic features worthy of considerably more research. These may include a lateral moraine, an esker or glacial ridge, associated meltwater channel, landslips, the remnants of a glacial tarn or lakebed, and possibly a cirque and/or a moulin system dewatering event.

Site photographs

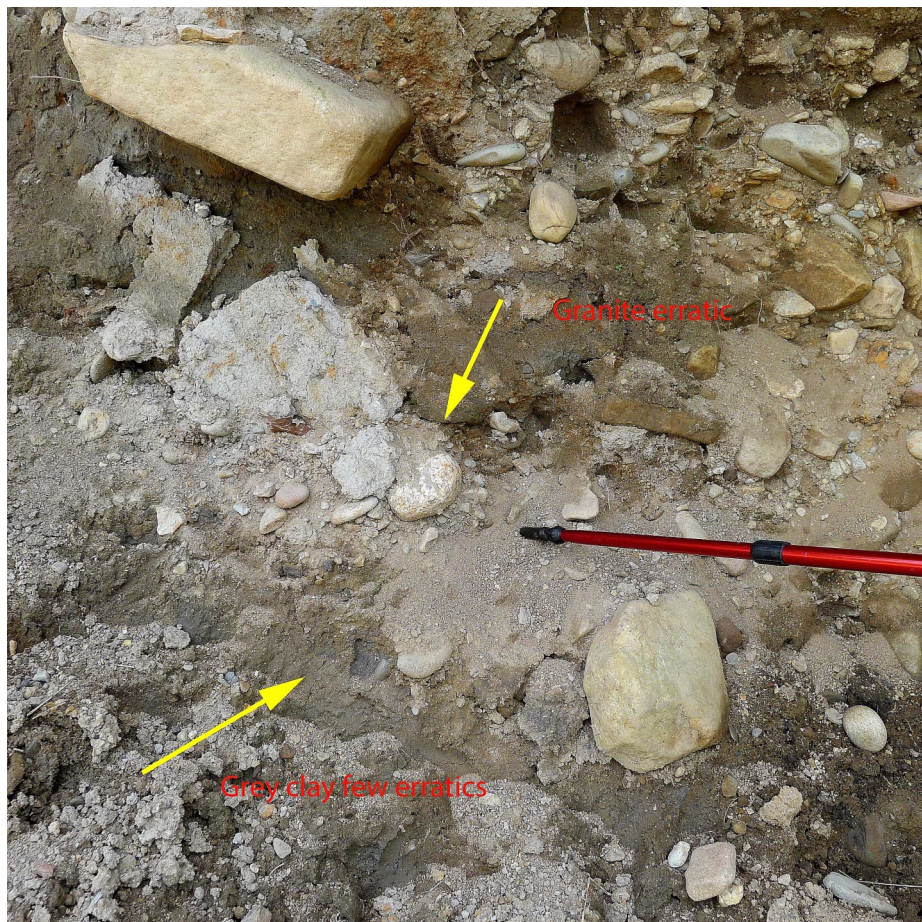
Possible lateral moraine



Possible lateral moraine



Till exposed in stream sections adjacent to lateral moraine (1)



Till exposed in stream sections adjacent to lateral moraine (2)

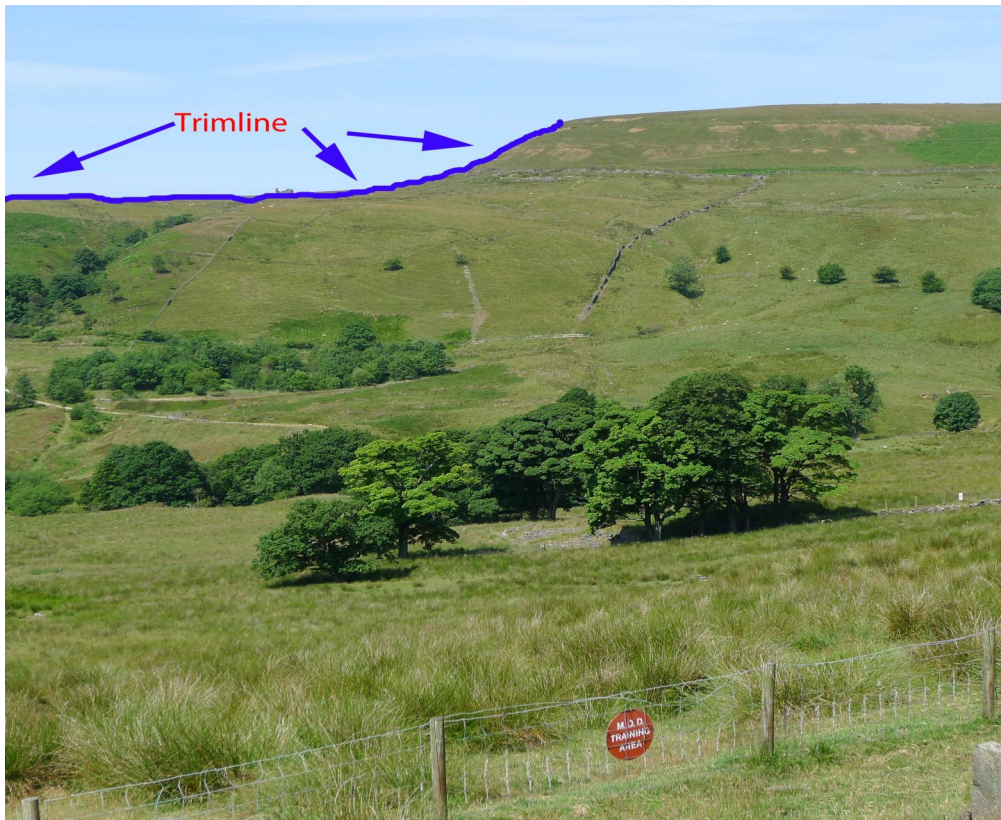


Granitic erratic from Lake District ice stream



Same stream section as above with abundance of local Carboniferous erratics

Position of supposed ice barrier

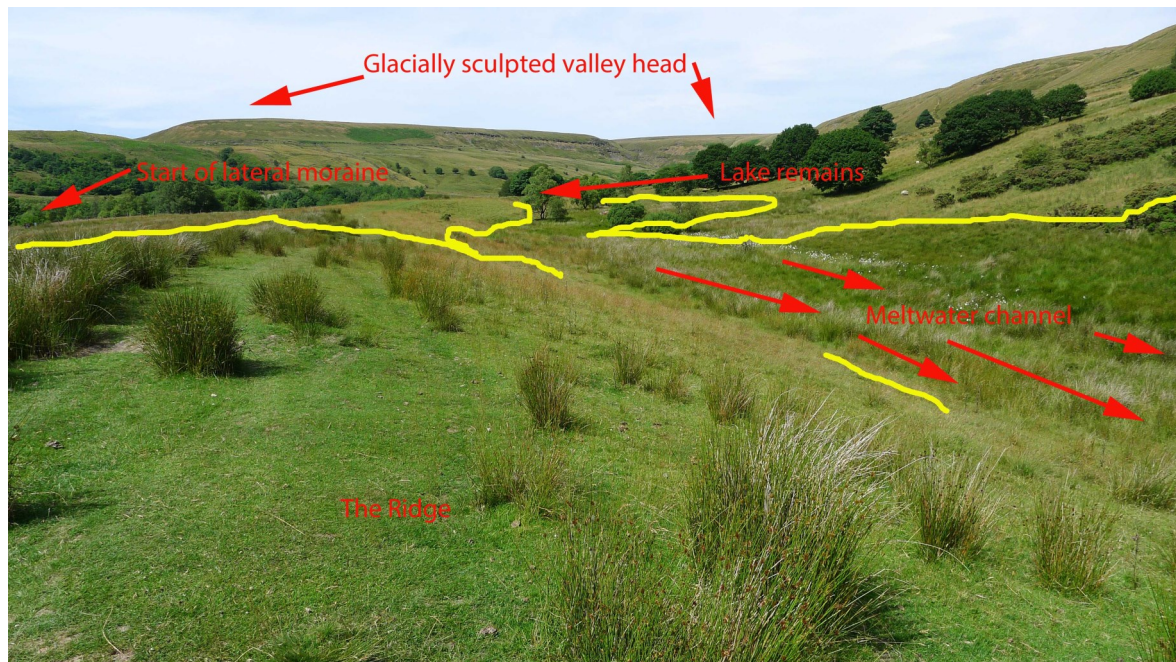


Trimline showing general position of ice-barrier to the west

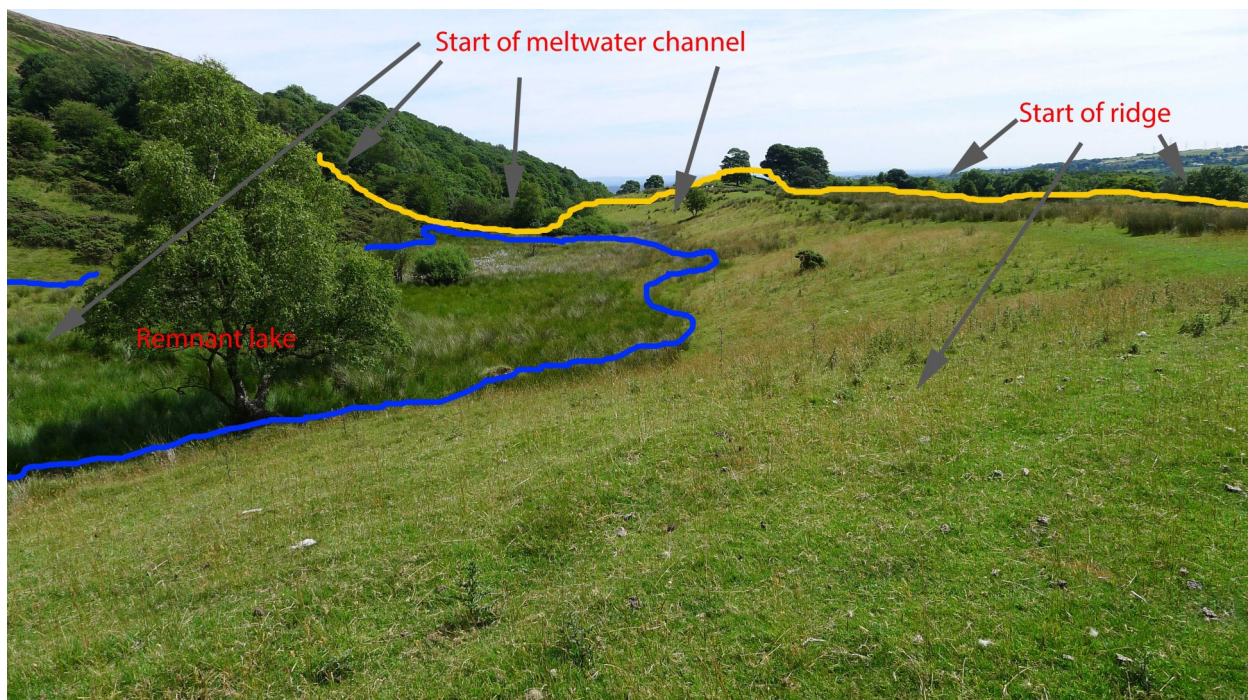


General view to north west of valley. The trimline or ice-barrier is top left of the photo, the lateral moraine left centre in valley, and Holcombe Valley Heads back centre right.

Meltwater Channel and associated ridge or esker



Upstream view of divergence of meltwater channel and The Ridge

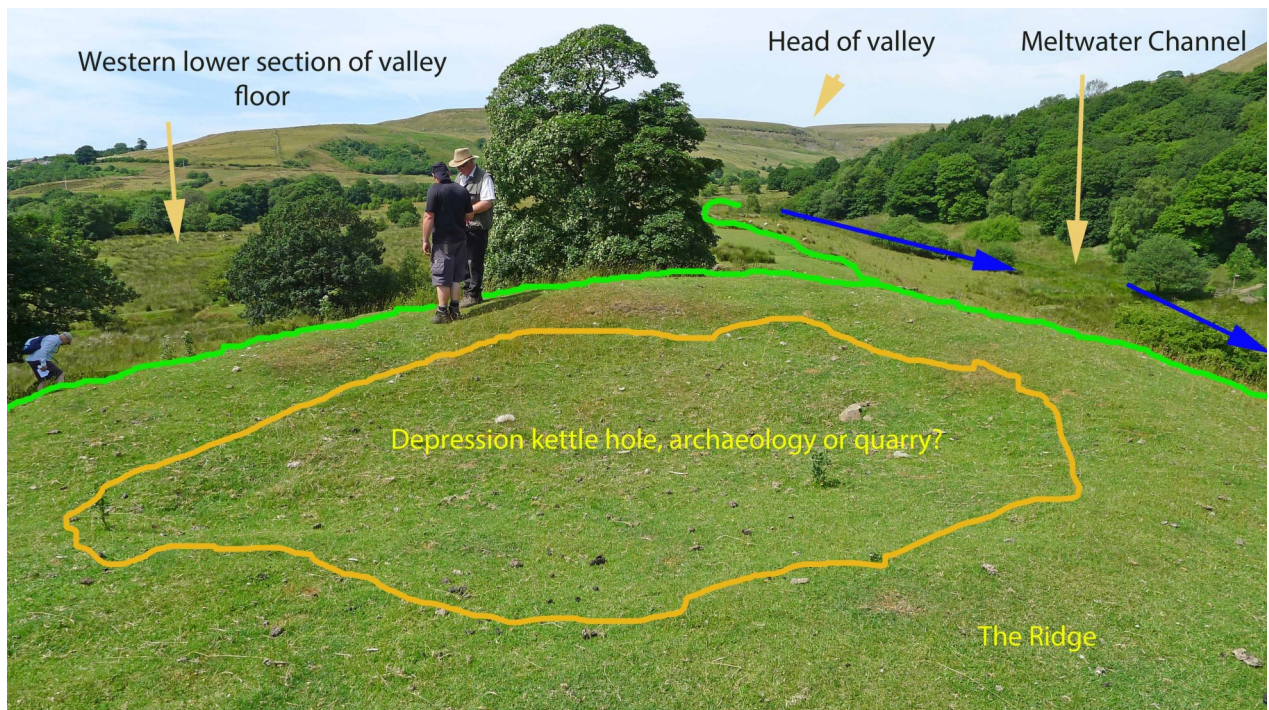


Downstream view of divergence of meltwater channel and The Ridge

Meltwater Channel and The Ridge



The meltwater channel deepens and the Ridge becomes more pronounced in the Lower section of the valley.



The Ridge or esker looking northward. The photo shows about two thirds of the width of the Ridge.

Possible temporary lakes



Several temporary lakes or tarns have been identified. The one above is at the lower section of the valley near the starting point (out of shot left) of the meltwater channel and possible esker.



Small level area above meltwater system possibly a temporary tarn or even remnants of a late-stage slow-moving drainage into the then almost dry meltwater channel.